WHICH ARE THE CAUSAL MECHANISMS OF A VRU-TO-CAR CRASHES?

MAIN CONTRIBUTING FACTORS

- Inadequate Plan (47%)
- Observation Missed (58%)
- Faulty Diagnosis (42%)

INADEQUATE PLAN

"COME ON! WE DO NOT NEED LIGHTS TO RIDE AT NIGHT! LET'S GO!"

"WHERE DID THIS CAR COME FROM? I HAVE NOT SEEN IT!"

"I THOUGHT THE DRIVER WOULD HAVE GIVEN TO ME THE RIGHT OF WAY!!!"

FAULTY DIAGNOSIS

OVERLOOKED SIDE EFFECTS

ERROR IN MENTAL MODEL

TEMPORARY OBSTRUCTION TO VIEW

ERROR IN MENTAL MODEL

INFORMATION FAILURE

MISJUDGMENT OF TIME OR DISTANCE

DURATION

DISTANCE

TIMING

GROUP 1

THE CAR WAS GOING STRAIGHT AND THE CRASH OCCURRED BEFORE THE INTERSECTION

VRU STAYED ON THE ROAD LONGER THAN THE CAR DRIVERS COULD HAVE EXPECTED

VRU HAD CROSSED ONE LANE AND CONTINUED INTO THE SECOND LANE

VRU WHO STARTED AN ACTION BEFORE IT WAS APPROPRIATE OR WHEN WAS TOO LATE

INTERSECTION CRASHES

THE 3 MAIN TRAJECTORIES

GROUP 2

THE CAR WAS GOING STRAIGHT AND THE CRASH OCCURRED AFTER OR AT THE INTERSECTION

GROUP 3

THE CAR WAS TURNING AND THE CRASH OCCURRED AFTER INTERSECTION

MAIN CONTRIBUTING FACTORS (CONTINUED EVENTS)

- Inadequate Plan (47%) - Observation Missed (58%) - Faulty Diagnosis (42%)

- Distance (50%)
- Timing (50%)

- Inadequate Plan (31%)
- Observation Missed (31%)
- Faulty Diagnosis (82%)

- Distance (30%)
- Timing (78%)

Habibovic, A., & Davidson, J. (2012) – Causal mechanism in car to vulnerable road user crashes: Implications for active safety systems. Accident Analysis and Prevention, 45, 381-399

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WHERE DID THIS CAR COME FROM? I HAVE NOT SEEN IT!

Come ON!! We do not need lights to ride at night! Let's go!

I though the driver would have given to me the right of way!!!

Information failure

Error in mental model

Misjudgment of time or distance

Temporary obstruction to view

Overlooked side effects

Error in mental model

Inadequate Plan

Observation Missed

Faulty Diagnosis

VRUs who started an action before it was appropriate or when was too late

VRUs stayed on the road longer than the car drivers could have expected

VRUs had crossed one lane and continued into the second lane

VRUs who started an action before it was appropriate or when was too late

The car was going straight and the crash occurred before the intersection

The car was going straight and the crash occurred after or at the intersection

The car was turning and the crash occurred after intersection